

**Written Statement of
Dr. Mark Wrighton, National Science Board
Before the Committee on Science
Subcommittee on Research
United States House of Representatives
2318 Rayburn Building
March 9, 2005
10:00 a.m.**

Chairman Inglis, Congresswoman Hooley and Members of the Subcommittee, I appreciate the opportunity to testify before you. I am Mark Wrighton, Chancellor, Washington University, Saint Louis, Missouri. My testimony today is in my capacity as Member of the National Science Board and Chairman of its Committee on Audit and Oversight.

The Chairman of the National Science Board, Dr. Warren Washington, regrets that he is unable to provide this testimony to you today. However, he did ask me to say that – On behalf of the Board and the widespread and diverse research and education communities that we all serve – he thanks the House for its long-term commitment to a broad portfolio of investments in science, engineering, mathematics, and technology research and education.

The Congress established the National Science Board in 1950 and gave it dual responsibilities:

- oversee the activities of, and establish the policies for, the National Science Foundation (the Foundation, NSF); and
- serve as an independent national science policy body to render advice to the President and the Congress on policy issues related to science and engineering research and education.

During our recent Retreat, Board Members re-affirmed their strong commitment to fulfilling these responsibilities. Board Members, including the NSF Director, also discussed the important role of the Board in establishing a vision and setting priorities for the Foundation. Approving the annual NSF budget is one way for the Board to set priorities.

I would like to provide some general comments regarding the NSF FY 2006 budget request, then update you on National Science Board activities over the last year and some of our priorities for the coming year.

FY 2006 NSF BUDGET REQUEST

The National Science Board has reviewed and approved NSF's FY 2006 budget request that was submitted to the Office of Management and Budget (OMB) in September 2004, and we generally support the President's budget request before you today. Given the overall cut to non-defense domestic discretionary spending, the Board respects and appreciates that the President's budget request recognizes the importance of returning NSF to positive growth. We are cognizant of the current Federal fiscal constraints that our Nation faces and that there are many worthy competing interests for a limited resource. However, we are also certain that the members of this House

Authorization Subcommittee fully understand the unique and long-term value of NSF programs in science and engineering research and education to ensuring the future economic health of our Nation, maintaining U.S. preeminence in discovery and innovation, and providing valuable contributions to homeland security efforts.

The Board fully supports the FY 2006 NSF budget focus on the four funding priorities that address current national challenges as well as strengthening the core portfolio's of NSF's research investment. We also recognize that a budget request of \$5.605 billion, representing a 2.4 percent increase over NSF's FY 2005 budget, is a significant investment in NSF programs in a time of National fiscal austerity. Nevertheless, it is incumbent on the Board to note that this request remains below the level of the 2004 NSF operating budget.

Should additional funds, beyond the Administration's request, be made available to NSF in FY 2006, the National Science Board would recommend support for a strong and growing role for the NSF in the Nation's investment in science and engineering (S&E) education, addressing the backlog of Board approved and prioritized Major Research Equipment and Facilities Construction (MREFC) projects, and addressing the financial burden to the Foundation related to the transfer of financial responsibility for icebreaker ships from the Coast Guard to the NSF.

Adequate preparation of future participants in the U.S. workforce, at all levels of education, will require increasing mathematics and science understanding and skills if the U.S. is to sustain global preeminence in S&T. The Board has underscored its concern about the poor performance of U.S. citizens in essential knowledge and skill areas in science, technology, engineering, and mathematics (STEM) fields, in comparison with other high technology countries. It is impossible to conclude that growth in our National capabilities can occur without continual enhancement of the skills of our workforce. We have relied too heavily on attracting international students and professionals to meet our workforce needs, and, as a result, we need to do a better job of preparing U.S. students for joining the S&E workforce. Other nations are competing with the U.S. for the best international students and most accomplished S&E professionals. We must recognize the critical challenge our Nation now faces in sustaining a U.S. science and technology (S&T) workforce that will be competitive over the long term in an increasingly global and competitive S&T environment.

The Board fully supports the proposed FY 2006 funding for MREFC projects, and appreciates the significant increase in funding for this budget category. Members of the House Authorization Subcommittee are aware of the exciting opportunities at the frontiers of knowledge that we are unable to pursue without the cutting edge facilities that are funded under this account. While funding for ongoing MREFC projects is the highest priority for the Board, the lack of any new project starts in FY 2006 will increase the concern of the science community that the U.S. is losing its ability to sustain cutting edge S&E research. Should additional funding for MREFC projects be available, the Board recommends, in priority order, support for Ocean Observatories and the Alaska Regional Research Vessel.

The third area for which the Board would recommend any additional NSF funding be allocated is appropriate support for the costs that NSF will incur with the transfer of financial responsibility for icebreaking activities previously supported by U.S. Coast Guard. The Administration's FY

2006 NSF budget request allocated \$43 million. The Board is very concerned that the true costs to NSF for these new responsibilities will be greatly more than \$43 million and will, therefore, drain resources from NSF research and related activities. We understand that a new NSF-Coast Guard Joint Working Group is discussing various options for dealing with this issue. In addition, we understand that the National Academies Polar Research Board is studying this issue and expects to provide an interim report in September 2005. When these two groups have completed their discussions and assessments, we urge Congress to factor their conclusions into any final budget decisions and provide adequate funding to fully support this new NSF responsibility.

Again, the NSB supports the integrated portfolio of investments in S&E research and education represented in the NSF FY 2006 budget proposal. It thoughtfully blends support for the core disciplines with encouragement for interdisciplinary initiatives, brings together people from diverse and complementary backgrounds, provides infrastructure for research and STEM education, and strengthens the NSF's management of the enterprise.

Further, in this time of National emergency, this budget for NSF continues to foster S&T that enhances our homeland security. NSF activities in this area include Critical Infrastructure Protection, Research to Combat Bioterrorism, Cybercorps/Scholarships for Service, Counterterrorism, and Physical/Information Technology Security. Of course, by enabling future discovery and innovation, NSF supports our Nation's long-term prosperity and economy security.

OVERVIEW OF NSB ACTIVITIES DURING THE LAST YEAR

During the last calendar year, even while going through a continuing evolution in terms of its operation, the Board has accomplished a great deal in terms of our mission to provide oversight and policy direction to the Foundation.

I would like to briefly highlight some of these accomplishments, but will not attempt to discuss them all here.

In terms of providing oversight for the Foundation, the Board has:

- reviewed and endorsed the Office of Inspector General Semi-annual Reports to Congress, and approved NSF management responses;
- approved the NSF FY 2006 budget request for transmittal to OMB;
- reviewed the Foundation's report on its merit review system;
- provided review and decisions on nine major awards or proposal funding requests;
- developed and implemented a Board process for re-prioritization of all Board approved, but not yet funded, MREFC projects; and
- provisionally approved the report *Setting Priorities for Large Research Facility Projects Supported by the National Science Foundation* (NSB/CPP-04-20).

The Board and Foundation are implementing the principles of the revised process described in this provisionally approved document for the FY 2006 budget. At the same time, the Board Office has implemented an extensive outreach effort to invite comments from nearly 400 individuals and organizations that would be expected to have particular interest in large facilities. We expect final revisions based on this additional review and input, Board approval of all revised procedures and policies, and full implementation of the revised process in the Fall, 2005.

With respect to providing policy direction to the Foundation, the Board has:

- approved a report on *Broadening Participation in Science and Engineering Faculty* (NSB 04-41) that addresses the need to increase the diversity of this component of the S&E workforce to more nearly reflect the diversity of the student body it serves, and
- approved elimination of agency requirements for cost sharing, beginning this year (2005), while retaining the 1 percent statutory cost-sharing requirement.

In terms of advice to the President and the Congress, the Board has:

- published and distributed widely *Science and Engineering Indicators 2004*, the 16th volume of this statutory, biennial series and initiated the *Science and Engineering Indicators 2006* report;
- published a policy statement accompanying Indicators 2004, *An Emerging and Critical Problem of the Science and Engineering Labor Force* (NSB 04-07), which draws attention to the disturbing long-term trends in U.S. education and the globalization of S&T that, if ignored, may result in a loss of U.S. leadership in innovation and high technology;
- approved the draft report on *Long Lived Data Collections: Enabling Research and Education in the 21st Century* (NSB/CPP-04-21);
- reported to the Congress on Delegation of Authority in accordance with Section 14 of the NSF Act of 2002;
- responded to four specific IPA-related questions that NSB's Executive Officer received from the House Appropriations Subcommittee for VA, HUD, and Independent Agencies;
- published and disseminated *Fulfilling the Promise: A Report to Congress on the Budgetary and Programmatic Expansion of the National Science Foundation* (NSB-03-151);
- provided testimony to congressional hearings;
- interacted with Office of Science and Technology Policy (OSTP) and OMB on NSF and S&E issues;
- provided briefings and presentations to the Congress and other policy organizations concerning the Board's reports and statements; and
- responded to specific questions and inquiries from Senators and Representatives.

In an effort to facilitate more openness of Board meetings in accord with the Sunshine Act, we expanded our practices for:

- providing public notice of all our meetings in press releases, the *Federal Register*, and the NSB Web site;
- treating teleconferences of committees as open meetings;
- providing much more information to the public in a more timely manner regarding meeting discussions and decisions; and
- encouraging public comment during the development of Board publications.

Also, this past year the Board:

- examined our policies and positions relevant to the recommendations of the National Academy of Public Administration report concerning the Board's implementation of the Sunshine Act, the use of Intergovernmental Personnel Act (IPA) employees and other rotators at NSF, the oversight of the NSF Inspector General, and the role of the National Science Board in oversight and setting policies for NSF;
- began implementing recommendations of the Office of Inspector General to continue enhancing our procedures and policies related to compliance with the Sunshine Act; and
- significantly increased and improved our direct outreach and communication with OMB, OSTP, Congress, other Federal agencies, various interest groups and the outside S&E research and education community.

To that end, the Board Office is contracting to develop monitoring and evaluation tools, to expand outreach, and measure the impacts of NSB statements, resolutions and reports; and to redesign the NSB Web site for greater accessibility and utility to the public.

- One thematic area of significant accomplishment was transformative or "high risk" research where the Board organized a Workshop on *Identifying, Reviewing, and Funding Transformative Research* and established within the Committee on Programs and Plans a Task Force on Transformative Research.
- Another thematic area of accomplishment this year was long-lived data collections where the NSB established within the Committee on Programs and Plans a Task Force on Long-Lived Data Collections; and prepared a draft report, *Long-Lived Data Collections: Enabling Research and Education in the 21st Century* (NSB/CPP-04-21).
- The year 2004 also saw the Board's examination of NSF issues related to broadening participation in S&E; as well as efforts toward obtaining industry perspectives on workforce issues. The Board has also continued its recognition of outstanding science, engineering and science education accomplishments through the Vannevar Bush Award, Alan T. Waterman Award, and Public Service Awards.

FY 2006 NSB BUDGET

The Administration's FY 2006 Budget Request of \$4.0 million for the NSB will be adequate to support Board operations and activities during FY 2006. The request seeks resources to carry out the Board's statutory authority and to strengthen its oversight responsibilities for the Foundation. We expect that the Foundation will continue to provide accounting, logistical and other necessary resources in support of the NSB and its missions, including expert senior S&E staff serving as a cadre of executive secretaries to Board committees and task forces.

At the urging of Congress, in FY 2003 the Board began examining options for augmenting its professional staffing levels. At its May 2003 meeting, the Board decided to begin a process to assess the feasibility of recruiting for positions that would broaden its policy support, provide additional legal advice, and enhance the Board's capabilities in advanced information technology. The Board Office has continued to implement the staff enhancement plan, adding four positions this fiscal year for support staff, including information technology staff, science assistants, national awards assistant, and filling the vacancy for an editor/writer. The Board Office will be recruiting two senior professionals to provide policy and legal support to the Board this year. The Board is very pleased with the progress of the staff enhancement process.

The NSB Office staff provides the independent resources and capabilities for coordinating and implementing S&E policy analyses and development. It also provides operational support essential for the Board to fulfill its mission. By statute, the Board is authorized five professional positions and other clerical staff as necessary. In consultation with the Congress, the Board has defined these professional positions as NSB senior S&E policy staff, and the clerical and technical positions as NSB staff that support Board operations and related activities. The full impact of increasing the number of professional positions closer to the statutory level is expected to occur in FY 2005, emphasizing a broadening of professional skills to support the Board.

In addition to the NSB Office's essential and independent resources and capabilities, external advisory and other services are especially critical to support production of NSB reports, and supplement the NSB staff's general research and administration services to the Board. These external services provide the Board and its Office with the flexibility to respond independently, accurately and quickly to requests from Congress and the President, and to address issues raised by the Board itself.

In FY 2006, the Board will expand its ongoing examinations of its role and responsibilities regarding the NSF's MREFC programs as it finalizes the development and implementation of a new protocol for the process by which major research equipment and facilities proposals are developed, prioritized, and funded; NSF policies for Long-lived Data Collections; NSF policies regarding the identification, development and funding of transformative "high risk" research; and policies to ensure an adequate and diverse S&E workforce for the future. These special activities are, of course, in addition to NSB's normal oversight of the Foundation.

For example, through the Board's Audit and Oversight Committee, which I chair, we are currently examining issues raised by the FY 2004 Financial Statement Audit and the NSF Office of Inspector General on NSF procedures for post award administration of grants and contracts.

The Board feels strongly that the reportable conditions surrounding post-award grant monitoring must be dealt with by NSF Management in a timely manner. NSF has assured the Board that corrective actions will be taken. It is my understanding that NSF Management has developed a draft corrective action plan and is currently discussing it with the IG. NSF has been requested to provide updates to the Board on progress in addressing this issue. I would expect that both the IG and NSF Management will provide the Board's A&O Committee with an update at our March meeting. While much can and will be done to address these issue in FY 2005, the Board is also cognizant that to fully implement the auditor recommendations for corrective action, with which the Board concurs, appropriate level of future funding must be provided.

At the request of Congress, and consistent with Board discussions during our recent Retreat, the Board will undertake the development and establish a new vision for the Foundation for the 21st Century. This visionary document will also include overarching goals with both long- and short-term priorities that take into account federal fiscal realities. We expect to work closely with the NSF Director and finalize this effort by the end of 2005.

At the request of Congress, the Board will also conduct an examination of the NSF Merit Review System and report our initial findings before the end of this fiscal year.

The Board will continue to review and approve NSF's actions for creating major NSF programs and funding large projects. Special attention will be paid to impacts of budget constraints on the S&T workforce, broadening participation in higher education, national S&T infrastructure, and the size and duration of NSF grants.

Effective communications and interactions with our constituencies contribute to the Board's work of identifying priority S&T policy issues, and developing policy advice and recommendations to the President and Congress. To this end, the Board will increase communication and outreach with the university, industry and the broader S&E research and education community, Congress, Federal S&T agencies, and the public. These activities will support U.S. global leadership in discovery and innovation based on a continually expanding and evolving S&T enterprise in this country, and will insure a principal role for NSF programs in providing a critical foundation for S&E research and education.

With our eight new Board Members, new openness, and new modes of operations, the Board has much to do in 2005. However the most daunting challenge we face is making the tough choices and prioritizing NSF programs and projects in the face of constrained Federal budgets and a growing competition for those funds.

CLOSING REMARKS

This is a difficult time for Federal budgets for S&E research and education and the institutions and individuals in the nonprofit and public sectors that rely on Federal support. For over 50 years the Federal government has sustained a continual, visionary investment in the U.S. research and education enterprise in the expectation that such investment would redound to the benefit of all Americans. That Federal effort has expanded the horizon of scientific discovery

and engineering achievements far and wide, leading to the realization of enormous benefits to our Nation and, indeed, all of humanity.

In recognition of the Federal fiscal realities our Nation faces, the National Science Board pledges that we will be a force for causing the NSF to set priorities, to make hard programmatic budget decisions and, as a result, to obtain the most benefits from the funds provided. However, even in a time of budget constraints, as a Nation we cannot ignore our growing dependence as a society on innovation for economic prosperity and the ever-improving quality of life Americans have come to expect. The Federal compact in research and education with the nonprofit sectors is an essential pillar of our Nation's global dominance in S&T.

We know what works—we have a very long history of success to draw on. We know the expanding frontiers of knowledge offer enormous opportunities for research and innovation. We also know that the education of all our citizens in the fundamentals of math, science and engineering must be addressed if the U.S. is to remain eminent in S&T when we enter the 22nd century. As other nations ramp up their investment in the infrastructure for S&E research and innovation, we cannot be complacent. The Federal investment in the Nation's S&T is a necessity for the Nation's future prosperity and security. The U.S. must sustain its advantages through continued wise, adequate Federal support for our S&E enterprise.